

# ADS

ADVANCED  
POLYMERIZATION  
SYSTEM



Technology

# APS

## ADVANCED POLYMERIZATION SYSTEM

FGM's unique technology consists of a combination of different photoinitiators that interact with each other and amplify the polymerization capacity of light emitted by the light-curing devices.

One of these photoinitiators is camphorquinone (in very low concentration), used only to initiate a chain reaction with free radical multiplication as sequential propagation occurs.

That way, with camphorquinone as a trigger, professionals can use all the benefits of the APS even when using their conventional light-curing equipment, without having to invest in specific equipment.

### ESTHETIC

Thanks to the transparency of most APS photoinitiators it was possible to develop polymeric materials with high esthetic performance, neutralizing the yellowish color of the camphorquinone. For example: premium composite **Vittra APS** and **Allcem Veneer APS** cement do not demonstrate significant variation in shade before and after light curing. In the chameleon composite **Vittra APS Unique**, these photoinitiators that are more transparent make the chromatic mirroring easier and make it possible to achieve perfect mimicry. In the case of **Ambar APS** and **Ambar Universal APS**, their colorless appearance makes all the difference in the cementation of veneers and no-prep veneers.

### LONGER WORKING TIME

Materials containing the APS system have 4 times less sensitivity to ambient light when compared to traditional ones. The possibility of performing esthetic restorations with **Vittra APS** is real, as well as having enough time to insert and sculpt a restoration with **Opus Bulk Fill APS** at once. It is also possible to simultaneously position and cement veneers with **Allcem Veneer APS**. And all that with the reflector's light on!

### CURING DEPTH

One of the important qualities of APS is that it provides better conversion of monomers to polymers even at great depths. This property is of great importance for all photoactivated composites but especially for **Opus Bulk Fill APS** and **Opus Bulk Fill Flow APS**, which are inserted in large increments, ensuring clinical longevity for restorations.

### MECHANICAL PROPERTIES

As the polymerization depth is increased due to the higher conversion degree of monomers to polymers, there is a better polymerization of the whole chain. This generates a significant increase in all mechanical properties such as flexural strength and resistance to fracture.

# GET TO KNOW THE PRODUCTS WHICH CONTAIN THE APS TECHNOLOGY.



Light-curing composite with capacity to match the tooth shade. From Bleach to D4 with a single composite. It has a BPA free formula.

— p.04



Premium composite with loads of spheroidal zirconium silicate. It offers high potential for polishing and shine longevity, besides having a BPA free formula.

— p.10



Light-curing adhesives with MDP with high strength and adhesive longevity. BPA free-formula.

— p.22



Light-curing resin composite for prep and no-prep veneers. Excellent shade stability and esthetic longevity.

— p.28



Low shrinkage composites for large increments. Faster restorations with the same longevity.

— p.30

# ONE SHADE FOR ALL SHADES



Technology



- Shade transmission facilitated due to the low concentration of camphorquinone in the composition: the APS system uses more transparent photoinitiators;
- Amplified polymerization capacity;
- Longer working time under the reflector's/ambient light;
- Increased mechanical properties;
- Chameleon effect: The composite captures and reflects the shade of the dental substrate during the polymerization process. The load, well-dosed opacity and esthetics of the APS system are fundamental to reach the perfect mimicry;
- High esthetics, mechanical strength, excellent shine capability and polishing.



- **From Bleach to D4 with only one shade!** It does not require layering in most cases and enables the adoption of a simple incremental technique, without using different degrees of opacity/translucency;
- **Convenience and cost reduction:** It does not require shade selection and, therefore, allows for faster restorative procedures, increases the professional's productivity and reduces the stock of the shades.

# THE REAL CHAMELEON EFFECT

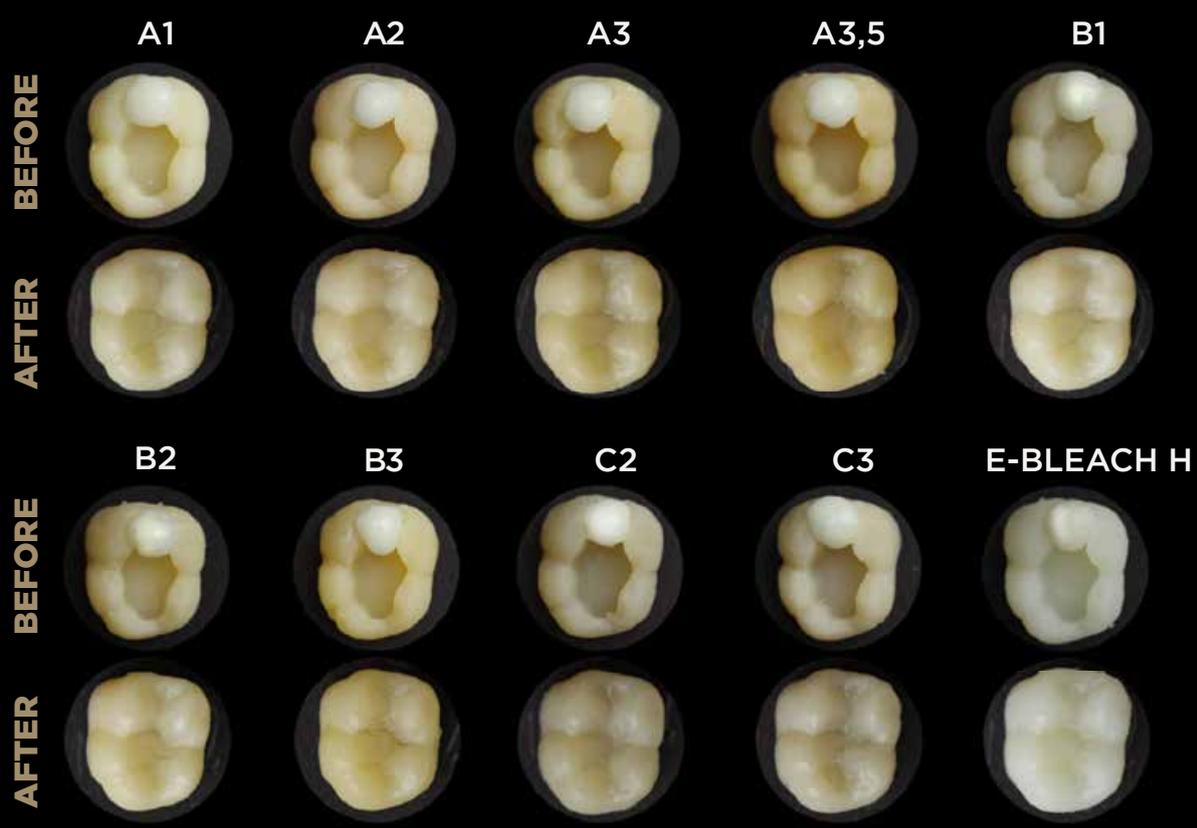
The optical properties of Vittra APS Unique define themselves after its polymerization. The chameleon effect occurs due to the chromatic mirroring characteristics of the composite, which is capable of capturing and reflecting the shade of the dental substrate.

Before the polymerization, the contrast and the opaquer shade of the composite facilitate the visualization and control of the restorative procedure.

Lastly, the fillers, the well-dosed opacity, and the esthetics of the APS technology are fundamental to achieve perfect mimicry.



## BEFORE AND AFTER POLYMERIZATION



## INDICATIONS

- Permanent and deciduous teeth: direct restorations of anterior and posterior teeth (classes I, II, III, IV, V, and VI).



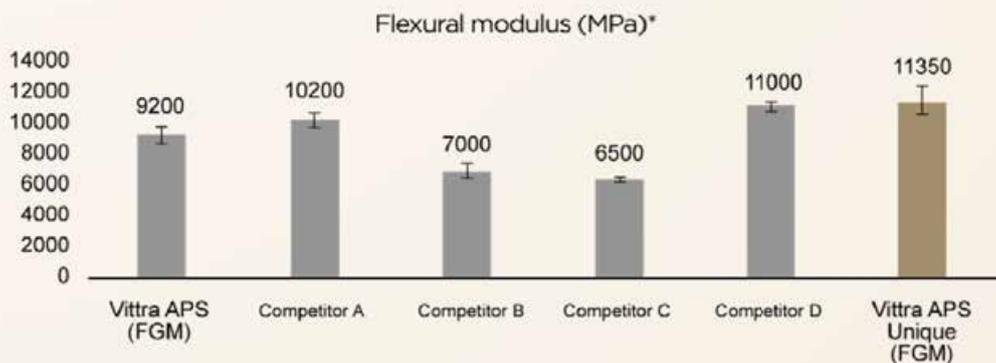
- For cavities of classes I, II, V, and VI, in case of darkening, cover the area with dentin composite or Vittra APS composite and proceed with the restoration using the incremental technique with Vittra APS Unique.



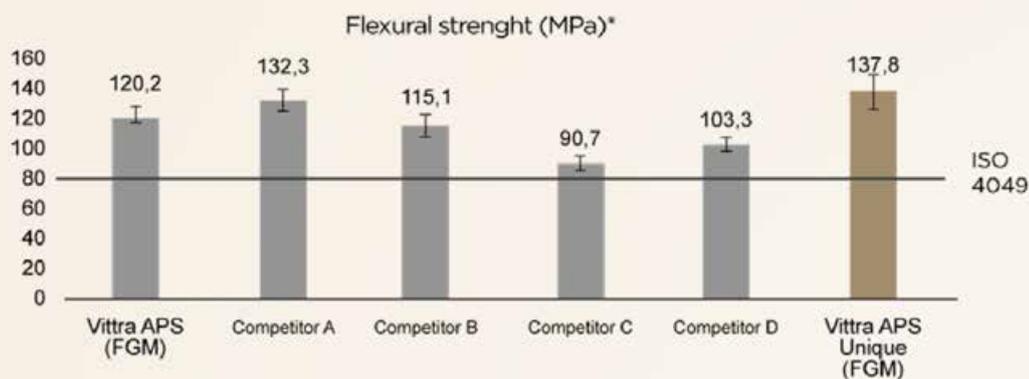
- Class III and IV cavities (without a back wall that provides shade support): make a layer that will serve as a background for the restoration and finalize the rest of the volume with Vittra APS Unique incrementally.



## SCIENTIFICALLY PROVED APS TECHNOLOGY



Vittra APS Unique presented compatible result to what is stated in the literature for human dentin (between 11700 and 18300MPa\*\*) and higher than competitors analyzed, demonstrating excellent resistance to occlusal forces, thus proving suitable for all classes of restorations.



Vittra APS Unique features flexural strenght superior to most competing products analyzed, with results up to 70% higher than the reference stipulated by the ISO 4049 standard (>80 MPa). The greater result, the greater the capacity of the composite to withstand the stress resulting from masticatory forces.

\*Internal data. \*\*Anusavice, K.J; Shen, C; Rawls, H.R. - *Phillips Materiais Dentários*. 12ª Edition. Rio de Janeiro: Elsevier, 2013.

## OPINION OF THE SPECIALISTS!



“A composite for clinical situations that require agility, stock economy, and clinical time gain, with an interesting esthetic result without compromising the quality of one’s work.”

*Dr. Claudio Sato and Dr. Adriano Sapata*

“Vittra APS Unique was the greatest discovery of 2020 in my opinion. It facilitates many situations due to its mimicry capacity. In my clinical routine and in my courses, I show how it is possible to use it in several situations such as: , diastema closures, incisal augmentations, reanatomizations and even pediatric dentistry.”



*Dr. Glauco Menezes*



“To simplify with quality! Vittra APS Unique is one of the rare choices that allow the clinician to minimize steps and always get the shade of their restorations right! Vittra APS Unique is unique.”

*Dr. Dayse Amaral*



LEARN  
MORE:

**Why you should use Vittra APS Unique:**  
**ONE COMPOSITE, MANY POSSIBILITIES!**

**Restoration in anterior tooth and diastema closure**



*Dr. Rodrigo Reis*



**Pediatric dentistry**



*Dr. Dayse Amaral*



**Restoration in posterior tooth**



*Dr. Claudio Sato and Dr. Adriano Sapata*



**Restoration over implants**



*Dr. Augusto Bessa*



# PREMIUM ESTHETICS

## EXCELLENT CONSISTENCY

## HIGH TECHNOLOGY



Technology



- At least 4x longer working time than conventional composites.
- Predictability of composite shade even before photopolymerization (shade does not change during polymerization).
- Increased mechanical properties.

SPHEROIDAL

ZIRCONIUM  
SILICATE

- High mechanical strength.
- Easy to reach and maintain the polishing and shining.
- Excellent consistency.





**TESTED and APPROVED**  
*Alessandro*  
**Prof. Dr. Loguercio**

**SMART  
SYRINGE**

- Dosing dip: precise portions with no waste.
- Reduced risk of cross contamination.
- Smart lock lid safe, ergonomic and practical.
- Labeled syringes for dentin and enamel and syringes with different shades.

**SHADE  
SYSTEM**

- All esthetic features in one simplified system.
- Available in 2g and 4g syringes.

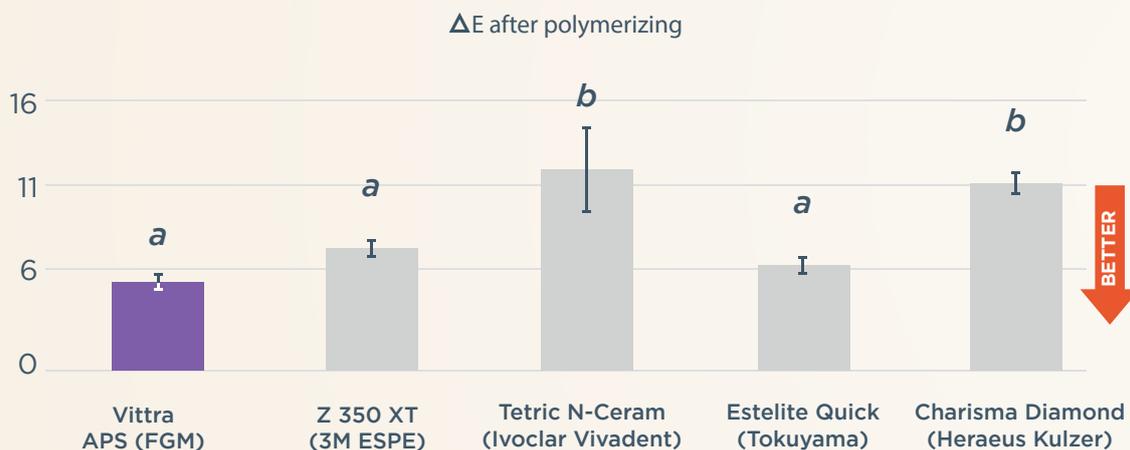
## HAVE YOU HEARD OF THE REVOLUTIONARY APS PHOTOPOLYMERIZATION TECHNOLOGY? VITTRA APS EXPLAINS IT TO YOU.

Have you ever wanted to have **more time to work with direct restorations**? Working with a composite that is less sensitive to room and reflector light is a great advantage, specially when building complex restorations. And, what if that same composite would **maintain its shade and opacity before and after**

**photopolymerization**, increasing the predictability for results? With the APS technology, that is possible, and the benefits are reached without the need to use a specific photopolymerization type of equipment.

### SCIENTIFICALLY PROVED APS TECHNOLOGY.

**Total predictability of shade and opacity before/after photopolymerization** The large majority of composites available on the market undergo a significant shade variation when photopolymerized. Vittra APS undergoes the lowest shade change.



Shade variation (ΔE average) before and immediately after polymerization [n=3] [1 factor ANOVA and Tukey test; p<0.05].

Source: Malaquias P., Carvalho E., Gutierrez F., Bauer M., Pailover P., Reis A., Bauer J., Loguercio A. Universidade Estadual de Ponta Grossa (UEPG) and Universidade Federal do Maranhao. 2016.

**Conclusion: the professional is able to visualize the final esthetic result in real time, even before photopolymerizing the composite.**

### LONGER WORKING TIME IN ILLUMINATED ENVIRONMENTS.

The APS system allows more working time for the Vittra APS composite when compared to systems with conventional photoinitiators available on the market.



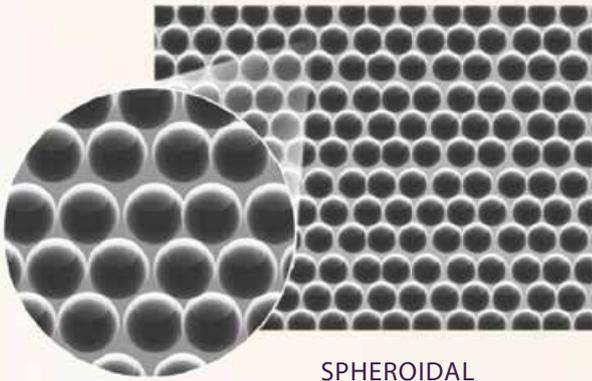
Working time with Vittra APS is, at least, 4 times\* longer than most of its competitors.

\* According to a test carried out by Prof. Dr. Rodrigo Reis.

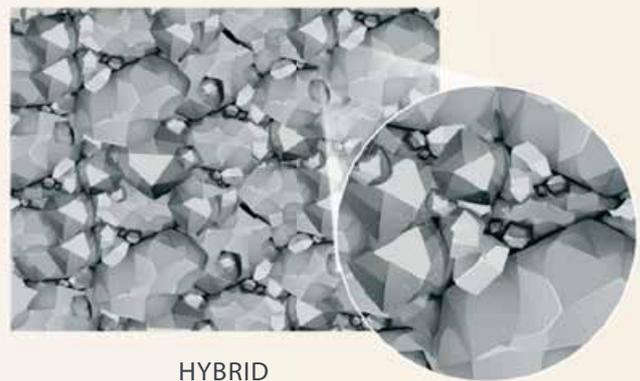
## ***SPHEROIDAL ZIRCONIUM SILICATE: IT MAKES ALL THE DIFFERENCE FOR BETTER RESULTS.***

Vittra APS's composition includes sub-micrometric loads of zirconium silicate, with particles measuring an average of 200nm. Their format, content and nature contribute to the obtainment of elevated

mechanical properties and excellent esthetics, which are perceived by the easiness with which polishing and high-shine longevity are obtained.



SPHEROIDAL PARTICLES.



HYBRID (NON-SPHEROIDAL).

Excellent polishing and shine longevity.

Excellent viscosity for handling. Does not adhere to the spatula, allowing for better design of restoration.

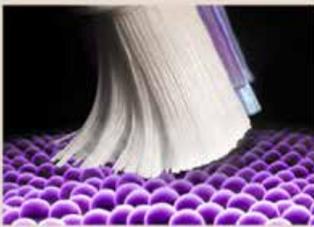


***SUB-MICROMETRIC LOAD OF SPHEROIDAL ZIRCONIUM SILICATE***

## GREATER RESISTANCE TO WEAR AND SMOOTHER SURFACE.

The sub-micrometric spheroidal zirconium silicate load present in the Vittra APS composite still the key to greater resistance to wear and amazing esthetics, because it acts as impact deflectors on the surface. Vittra APS was the only composite not to show an increase in surface roughness after simulated brushing. That result demonstrates the elevated resistance to abrasion and

reflects the properties expected due to the high Knoop Hardness value presented by the product. From a practical point of view, the surface smoothness of Vittra APS tends to increase, which explains the long-term maintenance of its shine.



Simulation of brushing over the surface of the composite Vittra APS.



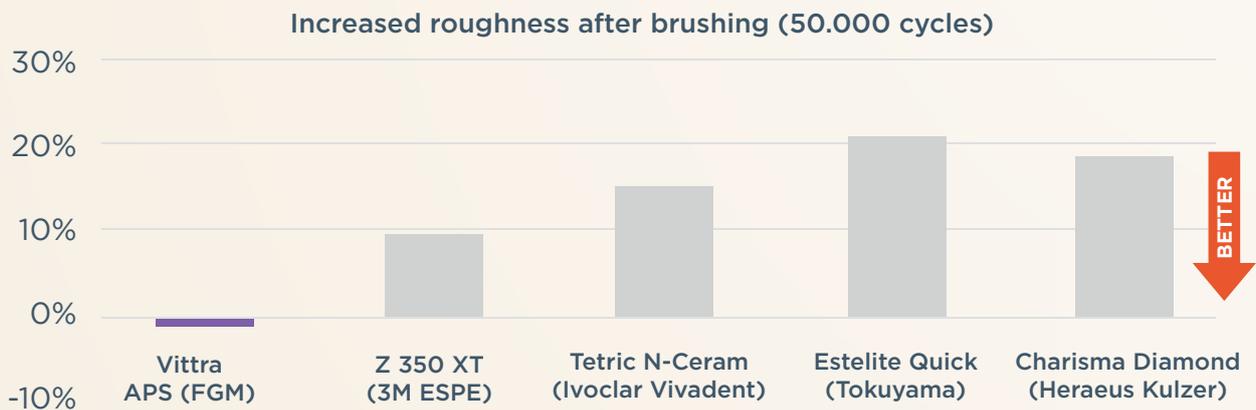
Smaller and spheroidal particles provide greater stability to the surface and are able to reflect with more efficiency the forces of the wear mechanism.



Simulation of brushing over a non-spheroidal composite surface.



Large particles generate large defects when the surface undergoes wear, resulting in the loss of shine due to the increase in roughness.



Increase in roughness (average in %) after simulated brushing (n+10).

Source: Palover P., Malaquias P., Carvalho E., Gutierrez F., Bauer M., Reis A., Bauer J., Loguercio A. Universidade Estadual de Ponta Grossa (UEPG) and Universidade Federal do Maranhão, 2016.

**Conclusion: Vittra APS was the only composite not to show an increase in superficial roughness after simulated brushing, demonstrating excellent resistance to abrasion and great polishing maintenance.**

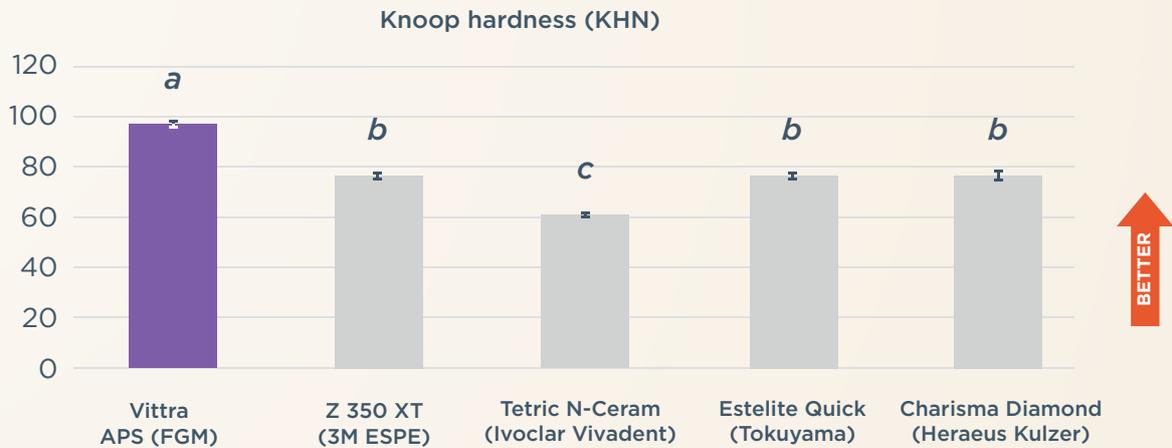


### **HIGH SHINE POLISHING:**

Vittra APS is able to provide extremely polished surfaces and maintain that shine even after an acid challenge<sup>1,2</sup>, which contributes to the longevity of the restoration, both functionally and esthetically. That performance is mainly due to the spherical geometry, size and quantity of load particles and the association with a polymeric matrix that is highly resistant to wear.

### **HARDNESS AND ENDURANCE:**

Hardness and wear endurance are properties that depend intrinsically on the mechanical properties of the composite, the type of stress to which it is submitted and the properties offered by the composite's load elements. Vittra APS's hardness originates from the quality, morphology and content of the loads used as well as from the quality of the polymer formed and its interaction with those loads.



Knoop Hardness (average and standard deviation in KHN) of different composites (n=5) (1 factor ANOVA and Tukey test; p<0.05).

**Source:** Carvalho E., Gutierrez F., Bauer M., Palover P., Malaquias P., Reis A., Bauer J., Loguercio A. Universidade Estadual de Ponta Grossa (UEPG) and Universidade Federal do Maranhão. 2016.

**Conclusion: Vittra APS showed greater surface hardness than the composites that were included in the test, contributing to the excellent mechanical performance.**

1. Maciel, A.P.C. Avaliação da rugosidade de resinas compostas após imersão em solução ácida com uso de confocal. Trabalho de Conclusão de Curso – Escola de Ciências da Saúde da Universidade de Brasília. Brasília, 69p. 2017.

2. Szekeresh, AJCC, Coelho, JKP e Amaya, OMC. Avaliação Da Rugosidade Superficial De Resinas Compostas Após Desafio Ácido. Unidade de Ensino Superior Dom Bosco, São Luiz – MA, 2018.

# SHADE SYSTEM

The concept of Vittra APS shades has the purpose of organizing and simplifying the whole evolution of composites. Vittra APS makes available the shades mostly used in simple and complex restorations. Following a worldwide trend, it comes with a single tone for dentin (universal) – shade A Vita Classical® - with 7 saturation options, which simplifies the professional's routine when choosing the shade to use.

## DENTIN



## ENAMEL



## TRANSLUCENT



## VALUE



### ***THE FANTASTIC TRANS OPL SHADE: ESTHETICS ALLIED TO RESISTANCE.***

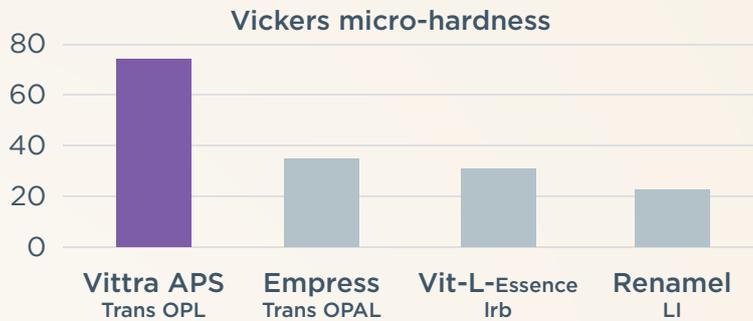
A composite recommended for incisal application needs to have differentiated optical properties and high wear resistance, because that region is the one that suffers the most with the masticatory process. Vittra APS Trans

OPL was developed aiming at the best performance as an incisal composite. The charts that follow show that **Vittra APS Trans OPL is the best composite for incisal application on the market.**

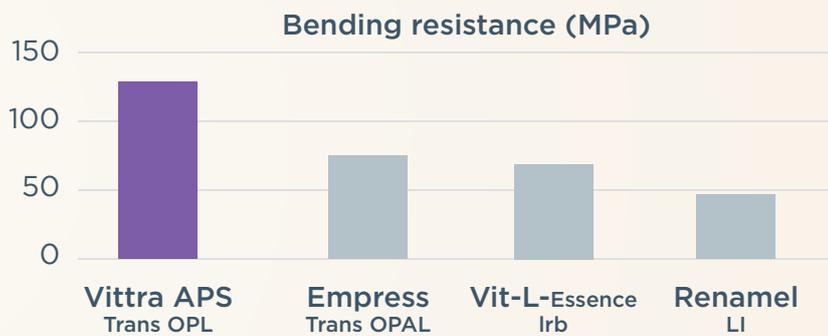


## SCIENTIFICALLY PROVED RESISTANCE.

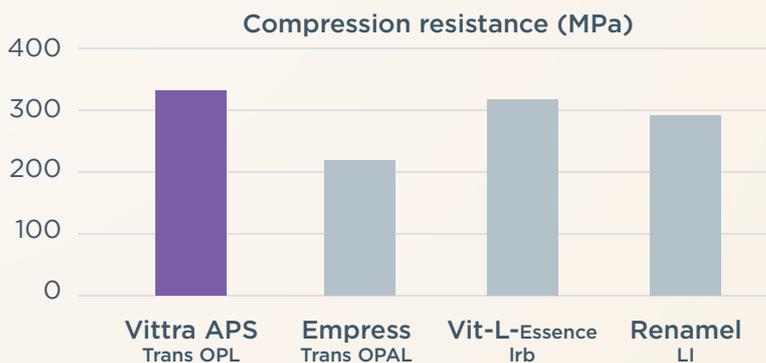
See the studies carried out with Trans OPL compared to the competition. All tests were carried out by Prof. Dr. Rodrigo Reis (Instituto R2) and Prof. Dr. Paulo Quagliatto (UFU).



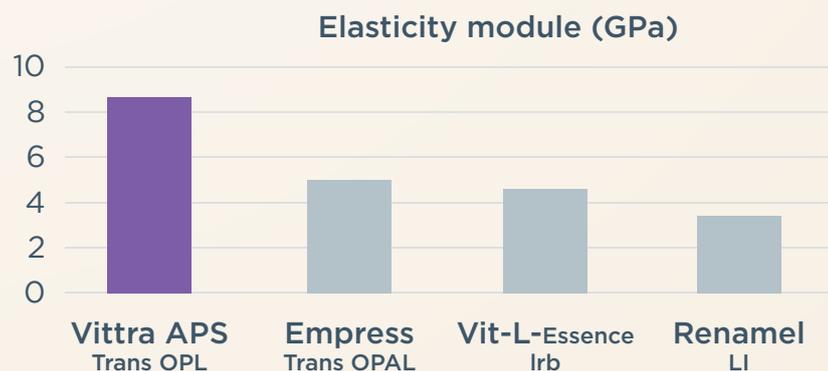
The higher the hardness, the greater the resistance to abrasion expected by the material. **Vittra APS has more than twice the hardness of the competition.**



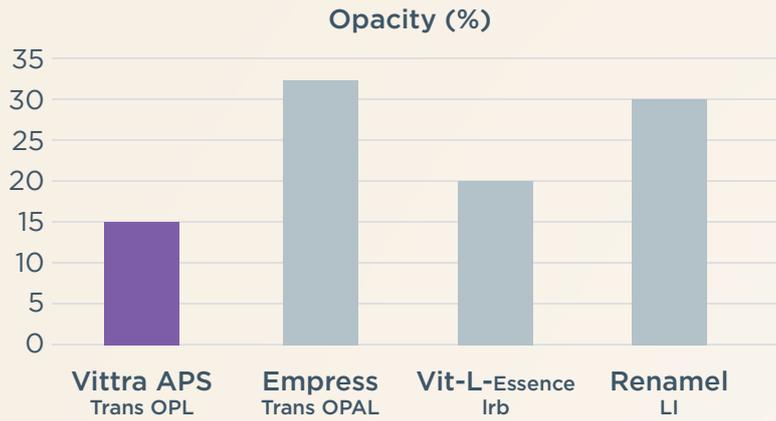
Bending forces happen during mastication and may lead to failure due to its cyclic character. Therefore, it is important to use a material that is highly resistant to bending. **Vittra APS Trans OPL shows excellent level of bending resistance.**



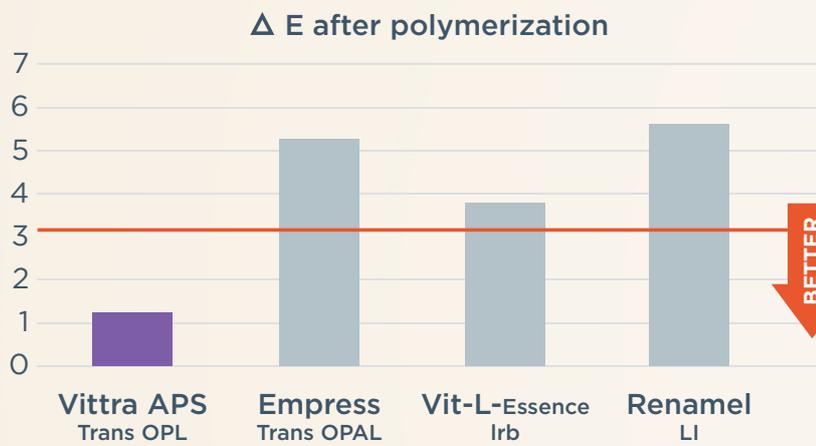
Compression is a force that occurs with high frequency over restorations during the mastication cycle and has direct influence in the longevity of the restoration. **Vittra APS Trans OPL shows higher compression resistance than its competitors.**



The elasticity module is related to the rigidity of the material. Lower values allow for deformation while higher levels make the material less flexible.



The chart shows that the Vittra APS Trans OPL composite is more translucent when compared to its competitors. Ideal for the effect of the incisal border.



Above this line, level of shade change perceptible to the naked eye.

ΔE indicates the magnitude of the total shade difference between before and after polymerization. The lower the delta E, the lower the visual perception of shade change before and after photopolymerization.

Source: Prof. Dr. Rodrigo Reis (Instituto R2) and Prof. Dr. Paulo Quagliatto (UFU).

## INCISAL EFFECT WITH MAXIMUM NATURALNESS.



Initial smile.



Reconstruction of the incisal border with Vittra APS Trans OPL, providing the opalescent aspect of the enamel border.



Final result.

Photographs kindly provided by Prof. Maciel Junior.

# OPINION OF THE SPECIALISTS!



One of the best premium composites introduced recently, with characteristics like: unperceptive change of shade between before and after polymerization and longer working time, even in contact with the reflector's light due to the development of an exclusive technology for light-curing called APS. It is worth mentioning the preoccupation with the future, when introducing in the market a composite that is BPA free. That substance is related to several health problems and the search for BPA-free dental products has been a trend.

**Prof. Dr. Alessandro Loguercio**  
Undergraduate, Graduate and Doctorate  
Professor of Odontology – UEFG/PR.



Vittra APS is a composite with excellent properties and stands out for maintaining its shade during polymerization, allowing for excellent working time even with the reflector on, for its capacity to allow for

**Prof. Dr. Leonardo Muniz**  
Master in Clinical Dentistry – (FO) – UFBA).  
Integrated Clinic Professor – (EBMSP).



I have been working with Vittra APS since 2018. I have made a lot of restorations in indirect and direct applications with this composite. I am amazed by the natural shade appearance, easy to reach and maintain the shining. The resistance can be compared to the hardest composites in the market, ideal for restorations.

**Prof. Dr. Luis A. Felipe**  
Master in Operative dentistry - UFSC.



Free from components that may have negative effects for the health of children.

**Prof. Dr. Sandra Kalil**  
Head of the subject of Dental Materials – UNIMES/Santos and UNINOVE/SP.



**A milestone in dentistry.**

**Prof. Dr. José Carlos Garófalo**  
Master in Restorative Dentistry at FO – USP.



**Fantastic polishing and handling.**

**Prof. Dr. Carlos Francci**  
Master, Doctor and Fulltime  
Professor of Dental Materials at FOUSP.

# CLINICAL CASE

## ESTHETIC ANTERIOR RESTORATION WITH VITTRA APS

*Author: Dr. Orlando Reginatto.*



Fig. 1a - Evaluation of the spontaneous smile.  
 Fig. 1b - Zoomed-in view of the incisive teeth.  
 Fig. 1c - Lips at rest.  
 Fig. 2 - Cavity preparation of the white stain of tooth 11.  
 Fig. 3 - Restorative test of the tooth 11 showing that there is no need for more wearing. Vittra APS composite in shades DA0, DA1 and E-Bleach was used.



Fig. 4 - Preparation of tooth 21 and isolation.  
 Fig. 5 - Fitting of the silicon index.



Fig. 6 - Vittra APS in shade Trans OPL for the palatal shell.  
Fig. 7 - Vittra APS in shade E-Bleach for the proximal walls.



Fig. 8a - Vittra APS in shade DA1 body composite covering the bevel of the teeth 11 and 21.  
Fig. 8b - Side view with the body composite finalized. Shade DA1 in the medium third and bevel. Shade DAO only in the incisal part.



Fig. 9 - Final layer of Vittra APS in shade E-Bleach.



Fig. 10 - Final photograph of the smile.

# ambar<sup>APS</sup>

Light-curing adhesive system  
for enamel and dentin.

## GREATER RESISTANCE AND ADHESIVE LONGEVITY.

### APS ADVANTAGES

- Excellent performance for both the specialist and the clinician, at any moisture level of dentin.
- Greater esthetic (colorless aspect).

- Increased adhesion to enamel, healthy dentin and dentin affected by caries.
- High conversion degree.
- Lower rate of marginal infiltration.
- Formation of a more resistant adhesive film.
- Longevity of adhesion.



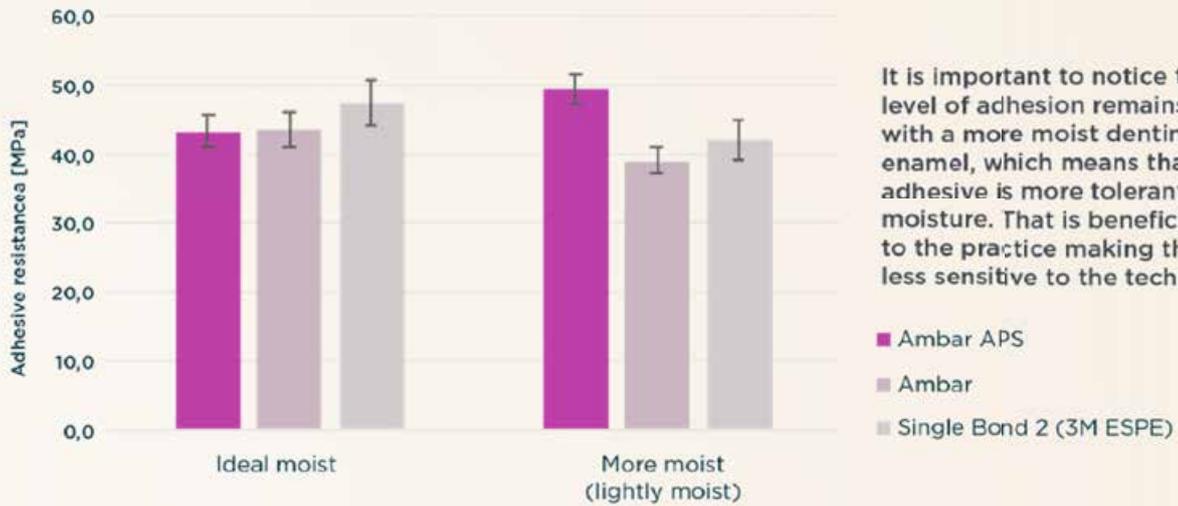
*The adhesive is ideal for application in hard-to-reach regions, such as in restorations on lower teeth or close to the gum.*



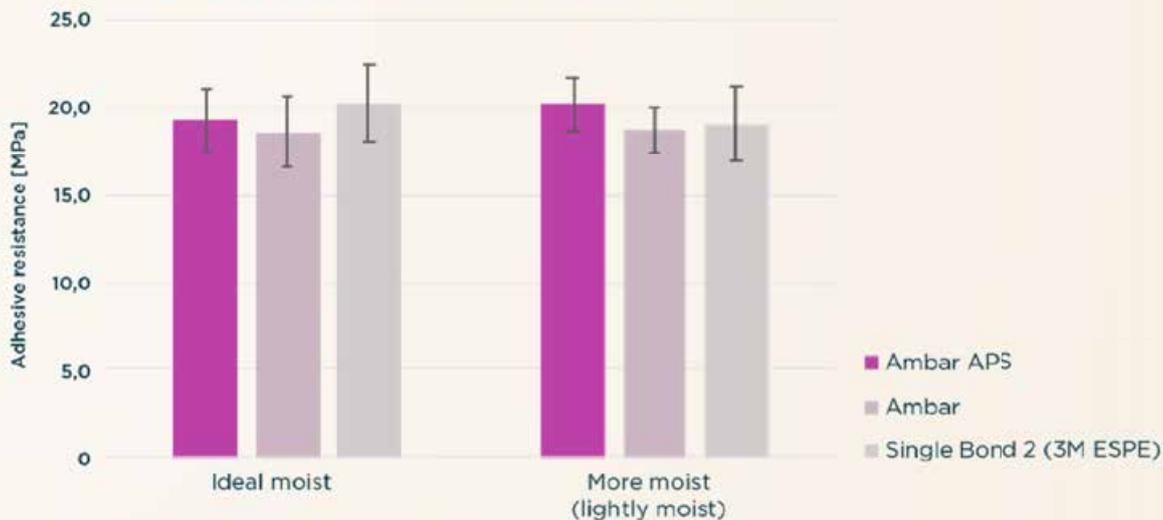
\*Colorless aspect of Ambar APS

Photograph: Prof. Dr. Javier Lemma

### Adhesive resistance to dentin [MPa]

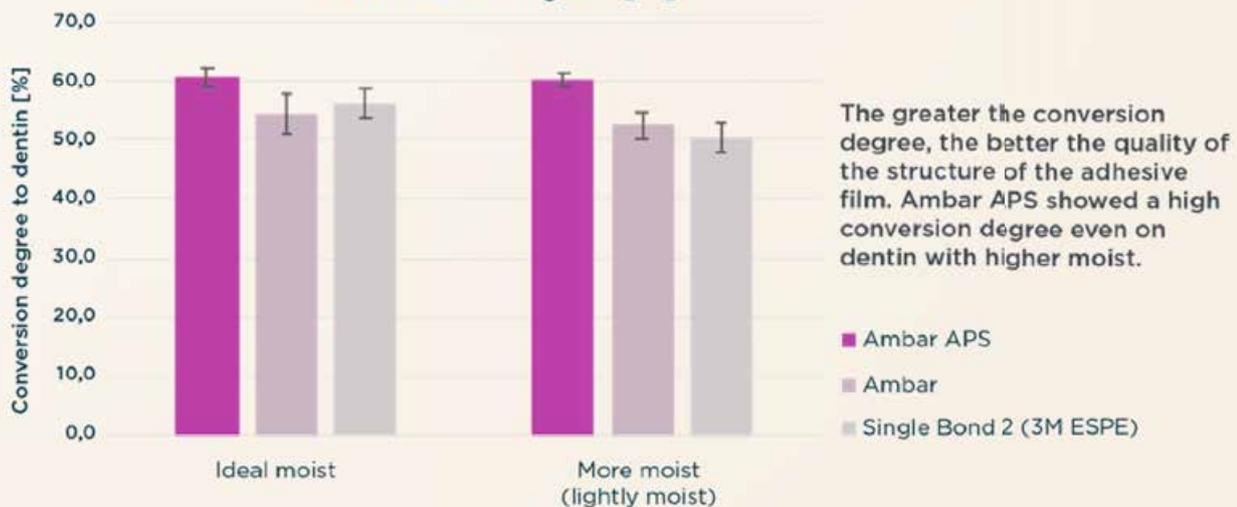


### Adhesive resistance to enamel [MPa]

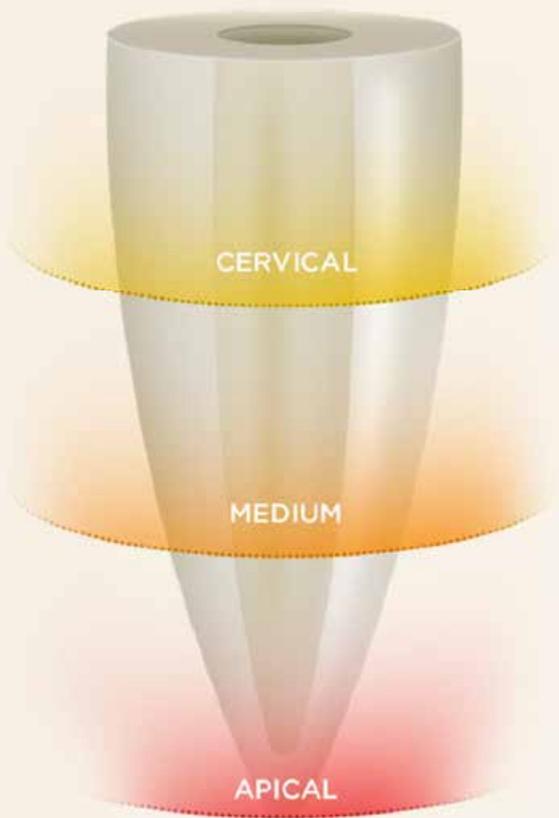


Source: Loguercio AD, et al., UEPG-PR, 2018.

### Conversion degree [%]

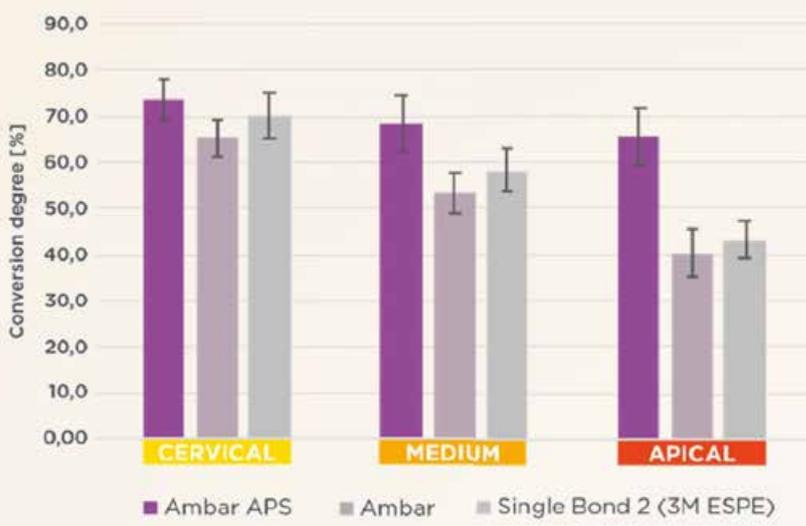


Source: Loguercio AD, et al., UEPG-PR, 2018.



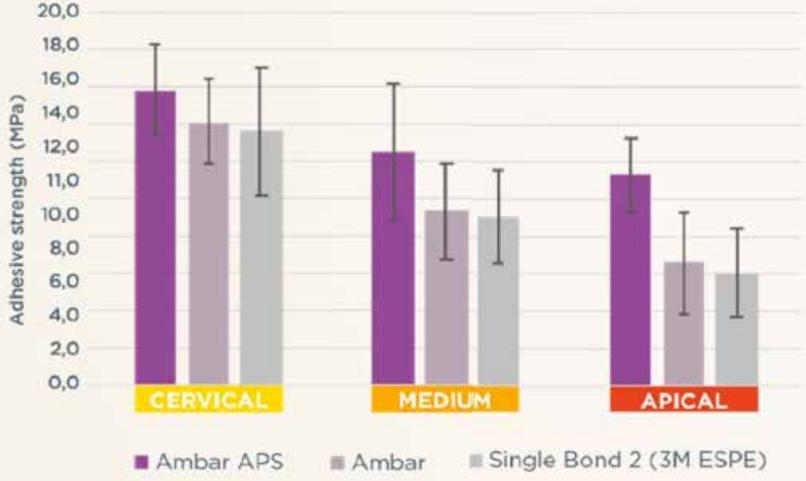
*Ambar APS stood out for showing the best result in the apical area, a critical area to achieve with light-curing device.*

**Intra-canal conversion degree [%]**



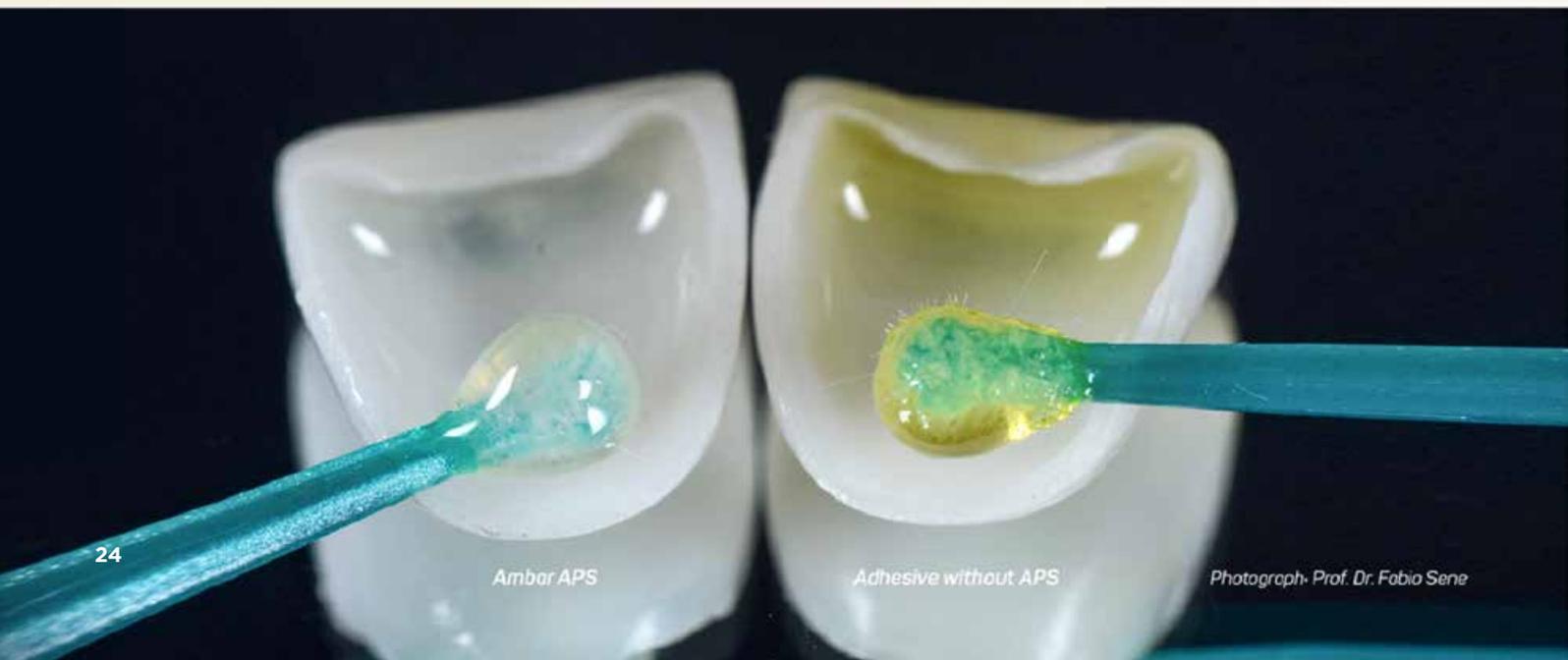
The high conversion degree in the apical third reveals the potential of the APS system in the polymerization of the adhesive.

**Adhesion to intra-canal posts (MPa)**



The intra-canal adhesion has always been a challenge for adhesives and cements. With Ambar APS, it was possible to achieve very high adhesion levels along the whole length of the canal, even in the apical portion that represents the most difficult area for adhesion.

Source: Loguercio AD, et al. UEPG-PR, 2018.





Self-etching light-curing adhesive system for enamel and dentin.

## HIGH PERFORMANCE IN MOIST DENTIN

### APS ADVANTAGES

- Excellent performance for both the specialist and the clinician, at any moisture level of dentin.
- Greater esthetics (colorless aspect).
- All the qualities of Ambar APS maximized.
- High adhesion in different forms of application: total acid etching, selective etching on enamel and self-etching.
- Adhesion to different types of surface: metals, ceramics, composites and fiberglass posts.
- Versatility with minimal sensitivity.



Increased adhesion strength and improved adhesive film stability.

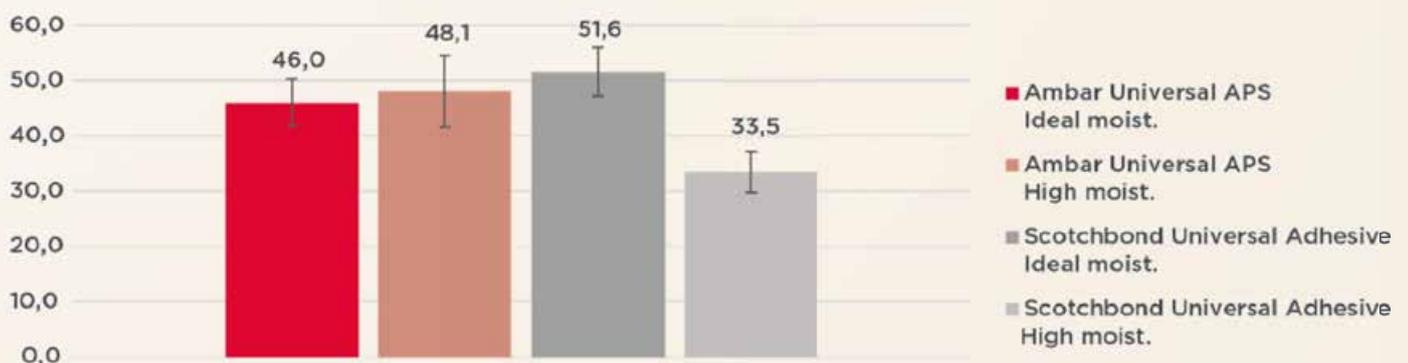


### THE MOST RECOMMENDED FOR INTRACANAL APPLICATION

- High adhesion rates in the intracanal region.
- Better polymerization even in the apical region.
- Greater compatibility with dual cements.

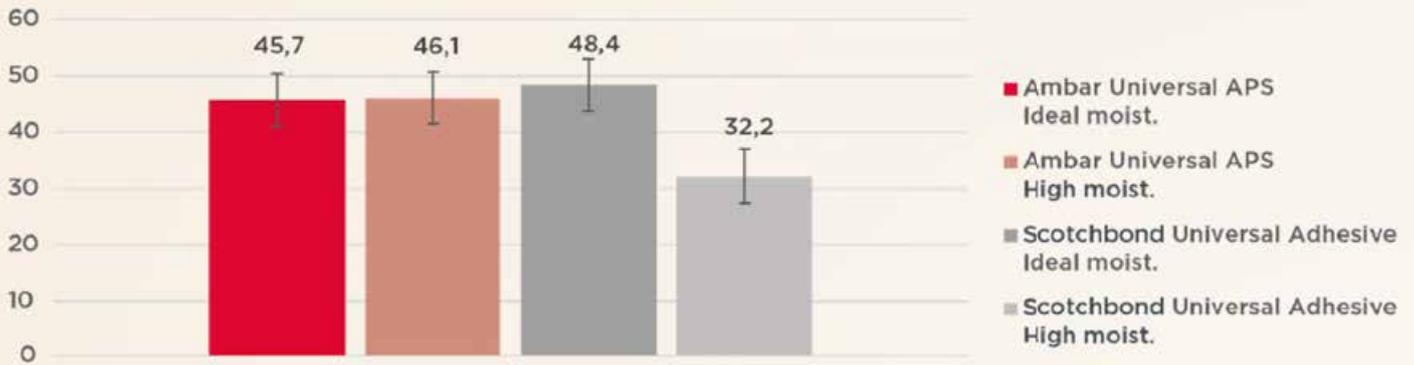


Adhesive longevity to dentin with phosphoric acid (MPa)



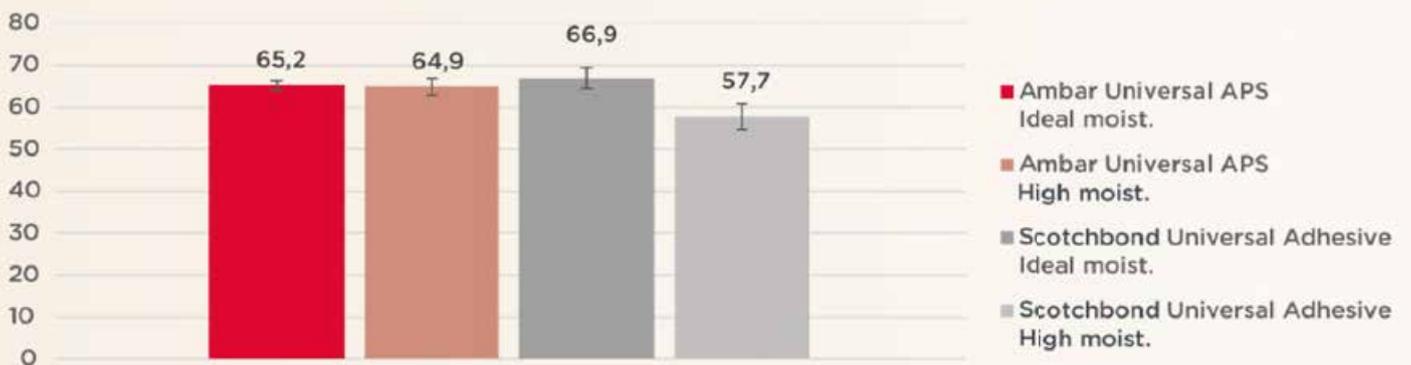
Loguercio, A.D. et al, Influence of dentinal moisture on the properties of universal adhesives, International Journal of Adhesion and Adhesives, Volume 101, 2020.

### Adhesive longevity to dentin without phosphoric acid (MPa)



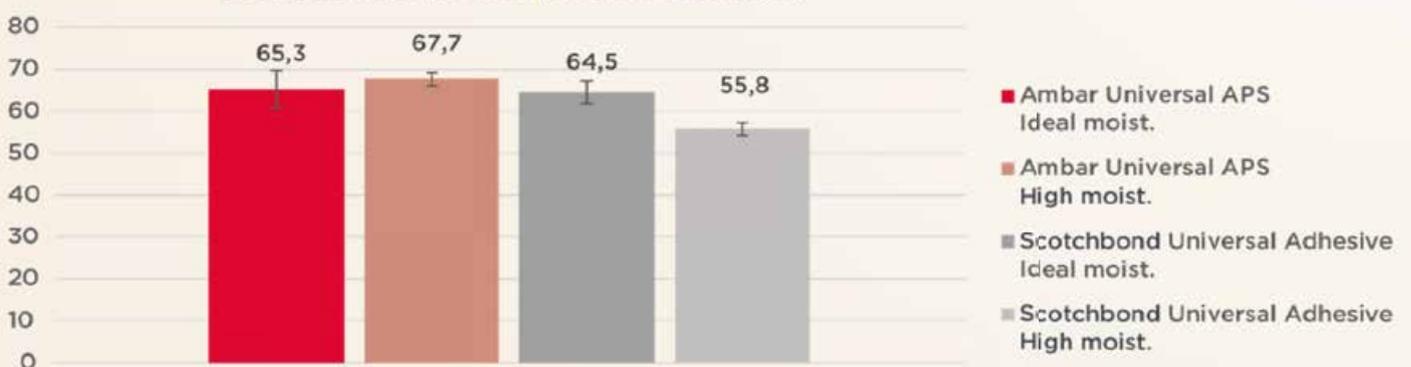
Loguercio, A.D. et al, Influence of dentinal moisture on the properties of universal adhesives, International Journal of Adhesion and Adhesives, Volume 101, 2020.

### Conversion degree with phosphoric acid (%)



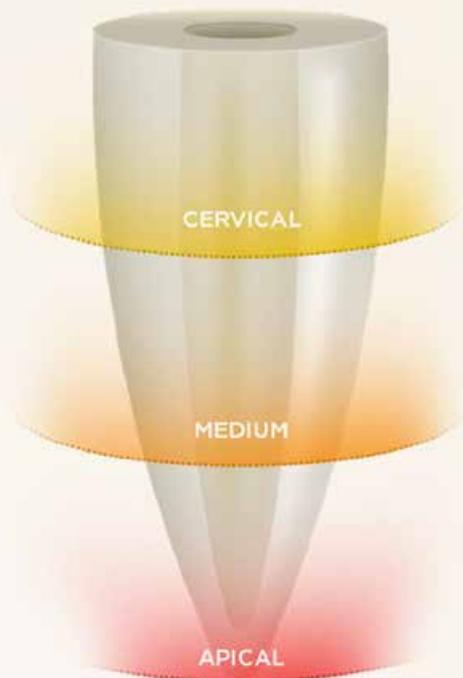
Loguercio, A.D. et al, Influence of dentinal moisture on the properties of universal adhesives, International Journal of Adhesion and Adhesives, Volume 101, 2020.

### Conversion degree with phosphoric acid (%)



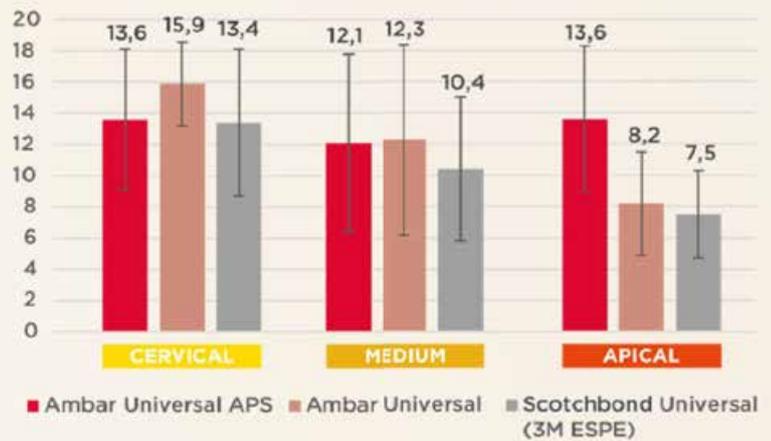
Loguercio, A.D. et al, Influence of dentinal moisture on the properties of universal adhesives, International Journal of Adhesion and Adhesives, Volume 101, 2020.

**Conclusion: regardless of acid etching and the level of dentin moist, AMBAR UNIVERSAL APS shows high adhesive resistance and conversion degree.**

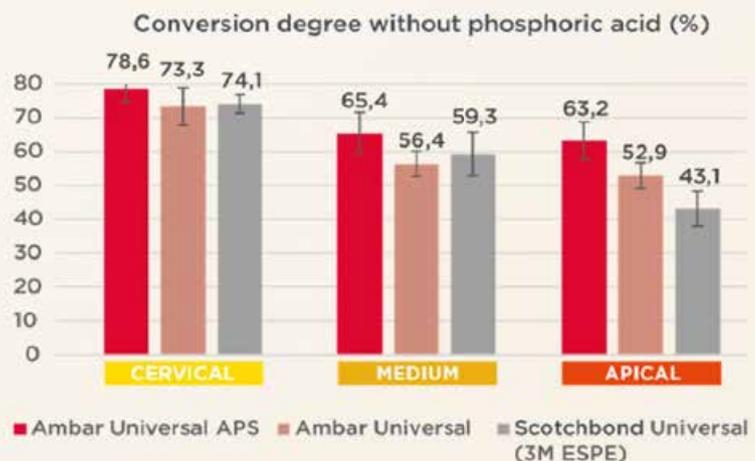
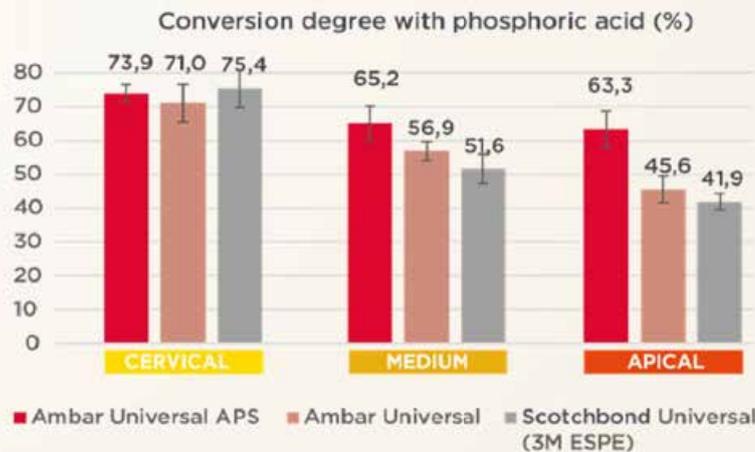
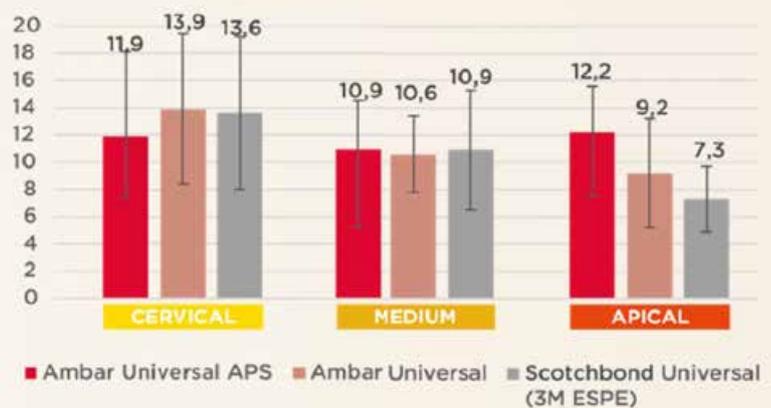


The high adhesion of Ambar Universal APS even without previous acid etching gives the professional the choice of not etching the canal before cementing posts, making the technique easier.

Intra-canal adhesion with phosphoric acid (MPa)



Intra-canal adhesion without (MPa)



*“APS brought to Ambar greater polymerization efficiency, a colorless aspect and even greater adhesive capacity”*  
PhD. Alessandro Loguercio

- Specialist and magisterium in restorative dentistry - UFPel, Pelotas | RS - Brazil.
- Doctor in dental materials - FO USP, Sao Paulo | SP - Brazil.
- Professor of graduate, master and doctor - UEPG, Ponta Grossa | RS - Brazil.
- Brazilian government investigator (CNPq) since 2002 - PQ 1A.
- Author of more than 370 articles in pubmed (Loguercio A).
- Author of two books: dental materials (Reis, Loguercio, 2007) and Tips in Esthetic Dentistry (Hirata et. Al, 2012).

V Hass et al, Effect of the Photo-initiator System Contained in Universal Adhesives on Radicular Dentin Bonding. Oper Dent 1 September 2020; 45 (5): 547-555

# Allcem Veneer<sup>APS</sup>

Light curing resin cement for veneers and no-prep veneers.

## HIGH ESTHETIC PERFORMANCE IN YOUR HANDS

Allcem Veneer APS is the ideal esthetic solution for adhesive cementation of thin ceramic pieces (up to 1.5mm). The product presents a technology that was specially developed for greater predictability, easiness and safety in the cementation phase. Get to know Allcem Veneer APS and achieve the best performance in your esthetic oral rehabilitation.

### APS ADVANTAGES

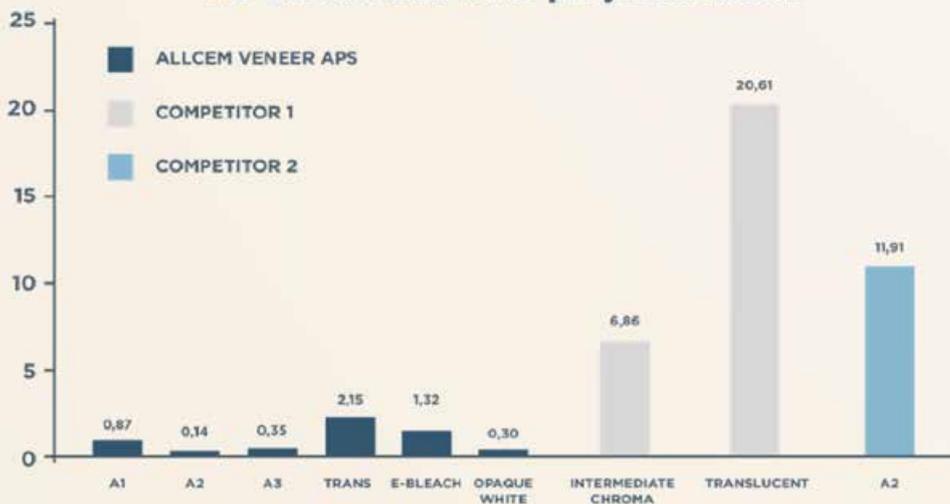
- Longer working time for veneer positioning in bright environment.
- Maximum esthetic predictability: no variation in shade and opacity after polymerization.



### $\Delta E$ before and after polymerization



### $\Delta O$ before and after polymerization



With such low shade and opacity variations it is possible to say that the shade of the cement when positioning the piece on the tooth is the same of that after polymerization. This increases the predictability of the result.

Source: internal data FGM.

## SHADE STABILITY

Since veneers and no-prep veneers are extremely thin and translucent, it is a crucial that the cement keeps its shade permanently not to compromise the esthetics.

After immersion in substances with a high pigmentation capacity, in a challenge test that extrapolates clinical conditions, the product showed shade variation that was similar to that of the competition.

ΔE	Allcem Veneer APS - FGM			RelyX Veneer - 3M			Variolink Veneer - Ivoclar		
	Water	Cola-based soft drink	Coffee	Water	Cola-based soft drink	Coffee	Water	Cola-based soft drink	Coffee
24h	1,6 d	1,4 d,e	4,6 c	3,3 c,d	1,8 d,e	4,2 c	6,2 b	0,4 e	2,0 d
7 days	1,3 d,e	3,9 c	7,2 b	1,7 d	4,2 c	6,4 b	1,3 d,e	3,3 c	8,6 a
30 days	0,4 e	1,3 d,e	8,1 a	2,1 d,e	3,1 d	9,5 a	0,5 e	2,8 d	8,0 a

Evaluation (average) of the shade stability of resinous cements for veneer. Different letters indicate statistic difference. (3-factor ANOVA and Tukey's test:  $p < 0,05$ ). Source: Muñoz M, Luque-Martinez I, Reis A, Loguercio A. Universidade Estadual de Ponta Grossa (UEPG), 2013.

## HIGH ADHESIVE STRENGTH TO DIFFERENT SURFACES (MPa)

	Allcem Veneer - FGM (MPa)	RelyX Veneer - 3M (MPa)	Variolink Veneer - Ivoclar (MPa)
Dentin	18,8 ± 1,2 a	18,5 ± 1,5 a	18,6 ± 1,7 a
Indirect composite	22,3 ± 1,6 A	12,8 ± 0,6 A	21,8 ± 1,4 A
Ceramics	14,9 ± 1,8 α	13,6 ± 1,2 β	12,3 ± 1,1 β

Bonding resistance of resinous cements for the facet to dentin, indirect resin and ceramics. different letters indicate statistic difference. (1-way ANOVA and Tukey's test for each property:  $p < 0,05$ ) Source: Muñoz M, Luque-Martinez I, Szesz A, Cuadros J, Reis A, Loguercio A. Universidade Estadual de Ponta Grossa (UEPG), 2013.

# 63%

### HIGH MECHANICAL RESISTANCE

With 63% of load in weight the cement forms an adhesive film with high resistance to bending and traction.



### EASY HANDLING

Rheology specially developed for maintaining the pieces in places and for facilitating the removal of excess material. Due to its thixotropy, it is not necessary to apply too much force to the piece when placing it, which prevents the fracture of such delicate pieces. Besides, the cement is capable of generating adhesive films that are extremely thin (around 30µm) which favors the adaptation of the pieces to the tooth.

# OPUS BULK FILL FLOW **AP**S

*Fluid low shrinkage stress  
light-curing composite for the base  
of restorations in large increments.*

The Opus line of composites allows for the optimization of the clinical time for direct restorations with no compromise of safety or quality. Showing low shrinkage stress and great curing depth, regular or fluid viscosity composites are perfect for extensive restorations on posterior teeth.

# OPUS BULK FILL **AP**S

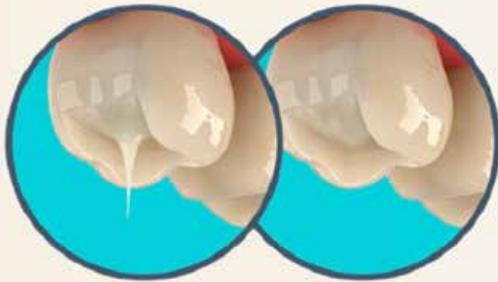
*Low shrinkage stress light-curing  
composite for restorations in  
large increments.*

**FILL UP ALL THE  
REQUERIMENTS OF A  
PERFECT RESTORATION.**

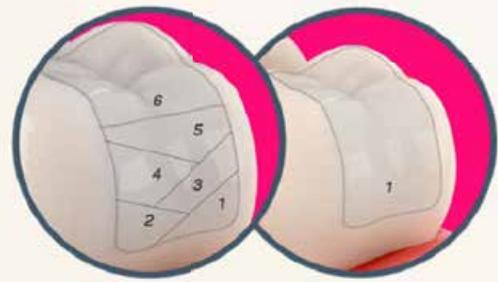
Restorations  
completed 66% faster\*



Restorations  
completed 75% faster.\*



**SMART VISCOSITY:**  
self-leveling and anti-gravity  
rheological effect



**INCREMENTAL  
TECHNIQUE**

**BULK FILLING  
TECHNIQUE**

## **AP**S ADVANTAGES

- Greater polymerization depth - up to 4mm.
- Low shrinkage stress.

**RECOMMENDED AS BASE FOR RESTORATIONS**

↳ Must be layered by a thick consistency composite.

## **AP**S ADVANTAGES

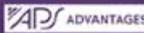
- Greater polymerization - depth up to 5mm.
- Longer working time for sculpture: stability under ambient/reflector's light.
- Greater opacity after polymerization.

**DOES NOT NEED LAYER COMPOSITE**

↳ A whole restoration made with only one composite.

\*When compared to regular restorative procedures.

**MAXIMUM CONVENIENCE AND VERSATILITY:**

- Greater opacity 
- Longer working time 
- 3 shade options (A1, A2 and A3)
- No waste of clinical time

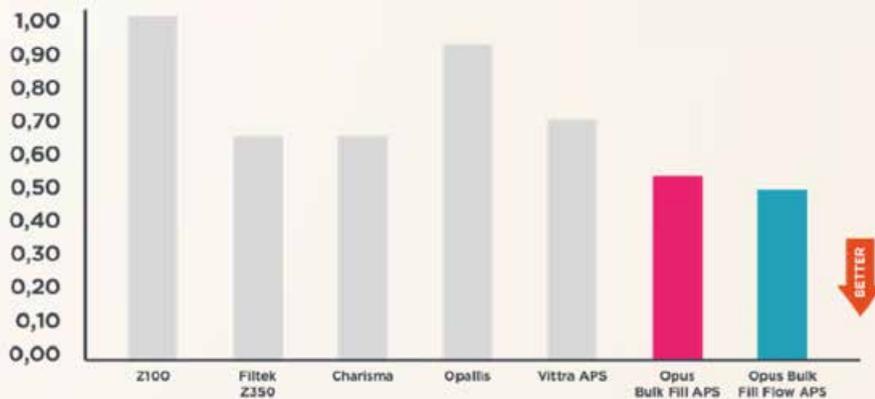
**Shrinkage stress.  
Finite elements.**



Shrinkage stress different restorative materials is represented in the image on the left originated in a finite element test. The red areas represent the areas with greater stress. It is noticeable that Opus Bulk Fill APS and Opus Bulk Fill Flow APS show the lowest level of shrinkage stress.

Source: Prof. Dr. Carlos José Soares et al, 2017

**Shrinkage after gel application - volumetric %**

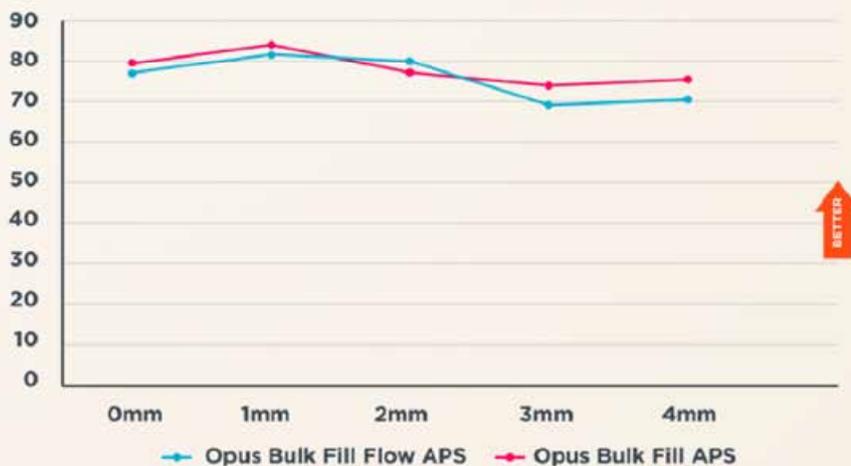


**LOW SHRINKAGE**

Materials with great volumetric shrinkage generate a higher level of stress on the tooth/adhesive/composite interface which may lead to functional damage to the restoration in time. Opus Bulk Fill APS and Opus Bulk Fill Flow APS obtained the lowest levels of volumetric shrinkage.

Source: Prof. Dr. Carlos José Soares et al, 2017

**Conversion degree - %**



**LOW SHRINKAGE**

Materials with great volumetric shrinkage generate a higher level of stress on the tooth/adhesive/composite interface which may lead to functional damage to the restoration in time. Opus Bulk Fill APS and Opus Bulk Fill Flow APS obtained the lowest levels of volumetric shrinkage.

Source: Prof. Dr. Carlos José Soares et al, 2017  
\*Check the product's technical profile on [fgmdentalgroup.com](http://fgmdentalgroup.com)

